5G in Underserved Areas of California

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Abstract

5G is the newest type of wireless broadband internet and it has been long awaited by many. 5G coverage offers much faster upload and download speeds compared to previous generations of wireless broadband. While 5G is going to be incredibly beneficial for many, the main drawback is that it only has a range of around one kilometer. Therefore, we face a serious optimization problem in placing these 5G towers. Areas with denser populations will be more economical to cover.
Our focus is on the potential 5G has as an alternative to traditional home Internet providers and wireline technologies, such as cable, fiber optic, and DSL connections.

Introduction

Objective

Located areas within California at the census tract level that does not meet the Federal Communication Commission (FCC) standard for modern broadband or does not have any affordable internet providers in the area. Then identify specific demographic factors about the tract to find reason why the area lack quality internet service.

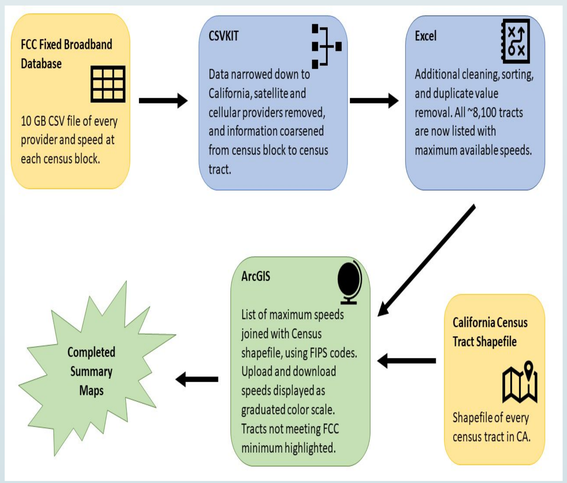
Motivation

There are many households throughout California do not have and lack access to quality broadband internet. In our current world internet broadband is crucial to the functioning of our society, and those who do not have access to reliable or affordable internet access are at a great disadvantage to those who do. This gap in accessibility and proximity to technology and the internet has been coined the “digital divide”. We believe that 5G could be used to help these households, and eventually close the gap.

Research Question

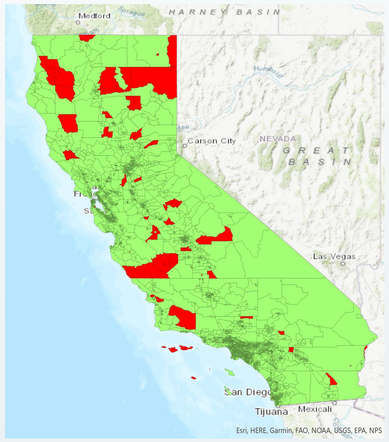
What areas of California currently lack affordable broadband Internet, and could benefit from 5G installations?

Methodology



Result and Discussion

Total California Census Tract Maximum Upload and Download

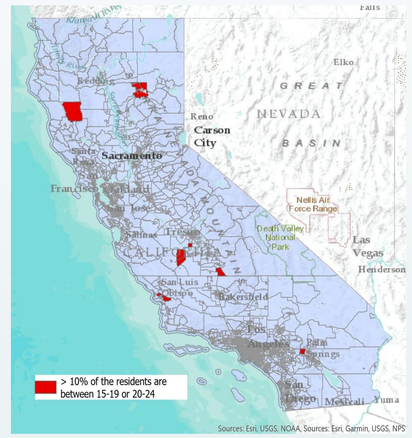


Criteria for tract selection:

- No wired Internet service
- Download speeds under 25 mbps
- Upload speeds under 3 mbps

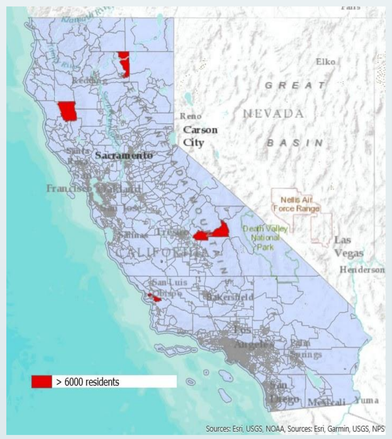
There was 8,100 California tracts there was only 67 tracts that fit within the criteria. The criteria is based on the FCC standard for modern broadband. There are 60,760 households and 210, 953 residents that live within these tracts.

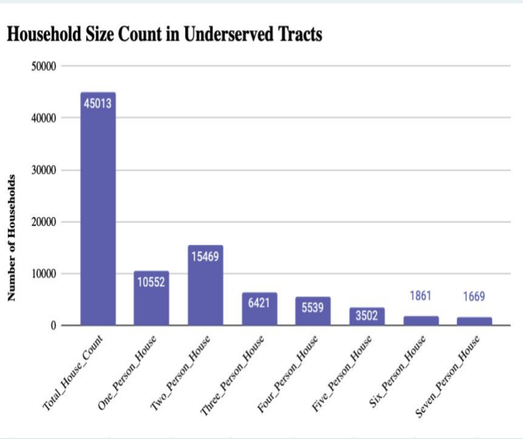
Age Analysis



This analysis was based on the assumption that people who are younger people would use the internet more in a households. We found that in 10 of the selected tracts had ten percent of the population were between the age of 15- 19 and 20-24.

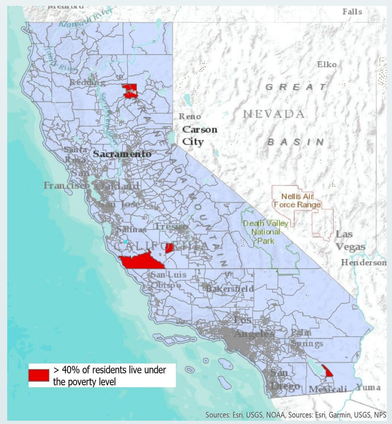
Economical Status

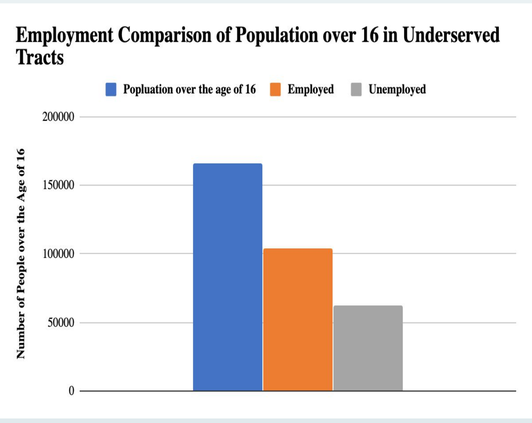




There are 6 tracts that are highlighted with a population size with more than 6,000 residents. Due to the unique factors of 5G census tracts that have higher population benefits from 5g installations because areas that have higher population tends to have larger households and have more people residing in closer proximity to another.
In the household count graph, 42% of the household in the underserved areas have three or more people living with in the house. When there are more people in a household there are more devices and more internet data being used.

Population Size





Tracts that have households with lower income would benefit from 5G. The map shows 6 tracts with 40% of there residents living under the poverty level.
Out of all 67 tracts that were considered underserved 35% of them does not any reliable service providers in their area. These areas have to rely on more expensive option in order to get adequate internet service.
The graph show the employment status over the total population over the age of 16, and provides visual representation of how many people are unemployed. Out of the total population that is over the age of 16 in the underserved areas 62,013 people are unemployed.

Conclusion

The digital divide and lack of broadband access is a serious issue in California. The 67 tracts identified as underserved contain 60,760 households and 210,953 residents, all of whom deserve access to the internet. We set up standard to locate tracts based on affordable providers and the FCC standard for modern broadband. After the analysis, the research showed that the areas that would benefits the most from 5G installation would be tracts with a higher youth population, tracts that were densely populated, and tracts with a larger number of the population in low income economic bracket. Our research focus specific on digital lacking areas because we believe that access to quality affordable internet is for everyone.